

UMAR KHALID

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EDUCATION

- **University of Central Florida, USA** **2020-2024**
PhD Computer Engineering, CGPA 4.00/4.00
Courses: Advanced Computer Vision, Advanced AI (Artificial Intelligence), Machine Learning

Research Area: Adversarial Robustness, Continual Learning, Anomaly Detection, Self-Supervised and Semi-Supervised Learning, Out of Distribution Detection, Noisy Labels

Current Research Project: **Backdoor Attacks in 3D Point Cloud**

- **Shanghai Jiao Tong University, China** **2016-2018**
MS Electrical Engineering, CGPA: 3.93 /4.00
- **National University of Sciences and Technology, Pakistan** **2010-2014**
BE Electrical Engineering
- **Fairleigh Dickinson University, NJ, U.S.A** (Non-Degree Exchange Program – Global UGRAD 2013)

RELEVANT SKILLS

- Python, Machine Learning, Pytorch, Keras C, C++, Java, PHP
- Computer Vision, Deep Learning, Power Electronics
- Linux, VMWARE, Matlab Simulink, Altium, DSP Microcontrollers
- DSP, Embedded System Design, FPGA, PCB Design

PROJECTS & ACCOMPLISHMENTS:

- **Machine Learning and Computer Vision:**
 1. RF Classification for 30 modulation Signal Classes that involved DSP based pre-processing and Deep Learning based architecture for classification for a defense related project while working for CWNLAB-UCF
 2. Efficient Data Selection for Smart training of Deep learning and Machine Learning model, CWNLAB-UCF, 2020
 3. Self-Supervised Adversarial Learning for Face Recognition systems for the course Advanced Computer Vision
 4. QR, Logo and Text based counterfeiting solutions for KOHLER, Castrol etc. MengBaby Inc., 2019
 5. Machine learning based image processing and classification solutions for BechoOnline.com, 2016.
 6. OpenCV based computer Vision solutions for Haris Pharma Pvt. Ltd., 2015.
 7. Machine learning based Image resolution enhancement, NUST, 2014
- **Electronics:**
 1. Bidirectional Electric Vehicle Charger design for PEARL Lab, 2018
 2. Topologies of Bi-directional smart solid-state transformers, Shanghai State Smart Grid Lab, 2017-2018

PROFESSIONAL EXPERIENCE

- **CHEP, Orlando, Florida**
Machine Learning Intern **01/2022- Present**
 - Developing computer vision application for efficient industrial processes
- **Florida Polytechnic University, Lakeland, Florida**
Adjunct Professor, Department of Computer Science **08/2021- 12/2021**
 - Teaching the Course **Introduction to Python** for the Data Science Certification
- **MengBaby Inc., Shanghai**
Software Engineer-Computer Vision **01/2019-03/2020**
 - My work encompasses the designing of Deep Learning-based Computer Vision Solutions, primarily focusing on Computer Vision-based Counterfeiting and Smart Healthcare Solutions.
 - Anti-counterfeiting is a task in which you enable the user to distinguish the original product from the fake or copied products. A user can use WeChat to scan the product to check if it is fake or not.
 - To solve this problem, we first segment the specific area from the product's picture using OpenCV or deep learning object detection. In the second step, the user's picture is compared with the standard picture in the database to check if it is fake or the original product.
 - Moreover, for healthcare solutions, technologies developed incorporated Facial Recognition, Object Detection & Segmentation, Text Recognition, GANs, etc.
- **Pacsquare Technology Pvt. Ltd., Washington, USA**
Software Engineer-Machine Learning, Computer Vision **05/2015-06/2016**
 - The job involves developing machine learning and computer vision-based solutions.
 - I was primarily asked to design techniques for Explicit Image filtering, message filtering, object detection, image-based auto-classification, etc. for the company's main product bechoonline.com which was the prime online marketplace in Pakistan.

RESEARCH EXPERIENCE

- **Graduate Student Researcher** **08/2020- Present**
CWNLab & Center of Research in Computer Vision, University of Central Florida
 - Projects Accomplished:
 1. Fast and Accurate Training of Machine Learning & Deep learning models using Data Selection Techniques.
 2. Self-Supervised Defense against adversarial attacks, RF Classification
 3. RF Modulation classification using CNNs (convolutional neural networks)- Industrial Project
- **Visiting Researcher** **08/2017-06/2018**
Power Electronics and Renewable Energy Lab, Shanghai Tech University
 - The project involved designing the Electric Vehicle Charger.
 - The topology of DC/DC power converters for electric vehicle applications was proposed and prototype was constructed.

- The research paper based on the experimental results was accepted at the Applied Power Electronics Conference, 2019 which is the most prestigious Power Electronics conference.

▪ **Undergraduate Research Assistant** **10/2013-06/2014**
School of EE & CS, NUST

- Research work on:
 - I. Cognitive radio networks to develop a multicast multipath routing algorithm using machine learning.
 - II. SVD (Singular Value Decomposition) based medical Image Resolution Enhancement
 - III. Information Security and Data Integrity

▪ **Visiting Researcher** **01/2013-06/2013**
Autonomous Vehicles Lab, Fairleigh Dickinson University, USA

- Worked on computer vision algorithm development for autonomous vehicles.

SELECTED PUBLICATIONS

- “CNLL: A Semi-supervised Approach for Continual Noisy Label Learning,” IEEE/ CVPRW, 2022
- “RODD: A Self-Supervised Approach for Robust Out-of-Distribution Detection,” IEEE/ CVPRW, 2022
- “RF Signal Transformation and Classification using Deep Neural Networks”, SPIE Defense + Commercial Sensing symposium 2022.
- “Two-way Spectrum Pursuit for CUR Decomposition and Its Application in Joint Column/Row Subset Selection,” Machine Learning for Signal Processing 2021, Queensland, Australia
- “Detect-and-Describe: Joint Learning Framework for Detection and Description of Objects,” CCVPR’ 18, Wellington New Zealand.
- “Dual-tree complex wavelet transform and SVD based medical image resolution enhancement,” Signal Process., 105 (2014), pp. 430-437

ACHIEVEMENTS & DISTINCTIONS

- Selected for prestigious ORCGS PhD Fellowship at University of Central Florida.
- Received High Achiever’s Scholarship in NUST for years 2010-2014
- Chinese Govt. Scholarship in SJTU for year 2016.
- Selected for Global UGrad program 2013 by U.S Department of State.